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Assessing performance drivers in cross-border M&A

Insights from the pharmaceutical and biotech
industries

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Abstract

This research is an investigation on the deal-specific factors impacting long-term performance of cross-border M&A and on the nature of such relations. The analysis is conducted on a sample of 187 cross-border deals completed within the pharmaceutical and biotech industries by Western European bidders between 2000 and 2009. Findings suggest that post-deal variation in gross profit improves when bidders diversify in other businesses, when assets are purchased instead of equity, and when stock is used as deal currency. Furthermore, the method of payment is found to moderate the effects geographical distance has on deal outcomes.

Keywords

Cross-border M&A; long-term performance; pharmaceutical; biotech

1. Introduction

The global pharmaceutical and biotechnology industries are among those that have experienced the most dynamic competition and industrial restructuring in the past decade, a phenomenon that is not expected to change in the near future¹. In such anticipated intense competitive developments cross-border M&A will perform a central role for companies' growth and survival, which makes it a compelling issue within the Corporate Strategies field.

Price reductions brought about by diminished healthcare budgets, limited product pipelines and decreased R&D productivity, together with smaller patent duration and surfacing of emerging markets are some of the challenges that will remain relevant in the near future². Adding up the new opportunities opened up by highly profitable and hardly imitable biologic drugs³, a considerably dynamic future ecosystem results.

Whether a vehicle for critical resources and capabilities acquisition or a mean to perform successful exit strategies, M&A will be one of the means to address strategic needs and, according to executives in the field⁴, a new wave is not unlikely to be expected⁵.

Although the core of global Pharmaceutical industry has traditionally been concentrated in Western Europe^{6,7}, the rise of emerging markets together with a more favorable US

¹ (Clifford Chance 2012; Karwal 2009)

² (Clifford Chance 2012)

³ (Lloyd & Sowlay 2010)

⁴ (Clifford Chance 2012)

⁵ (Friend & Arlington 2007)

⁶ (Achilladelis & Antonakis 2001)

⁷ This is a reason why acquiring firms in our sample have been selected according to their location in Western Europe

biotherapeutics regulation⁸ might justify domestic investment replacement with cross-border activity⁹. This motivates the choice of studying the performance of Western European acquirers following their cross-border M&A deals.

The present work is an investigation on the factors related to better M&A performance and on the nature of such relations. The aim is to fill the gap left unexplored in extant studies on the pharmaceutical and biotechnology industries, answering the following research questions:

Which are the deal-specific factors impacting long-term M&A performance in cross-border deals and how do they impact cross-border M&A long-term outcomes?

Dealing with the topic from a managerial perspective, this research will contribute to provide insights about past cross-border M&A activity as well as a partial framework for future practices.

2. Literature review

In order to gather a thorough understanding of the factors driving M&A performance, state-of-the art research was thoroughly investigated and findings were then aggregated in the taxonomy below.

Acquiring-firm specific factors. Innovation intensity¹⁰ is a first significant determinant of CAR¹¹. This is consistent with the essentiality of internally generated knowledge assets, provided that external knowledge alone would not be sufficient in sustaining international

⁸ (Lloyd & Sowlay 2010)

⁹ (Clifford Chance 2012)

¹⁰ Measured as R&D expenses and disclosed intangibles levels

¹¹ (Francoeur 2007); *Cumulative Abnormal Returns* are a metric for capital market expectations about M&A outcomes

performance¹². Indeed, in the pharmaceutical industry previous access to target R&D activities information and higher negotiating power are positively correlated with acquirer's performance in case of outsourced R&D¹³. Assimilating new external knowledge is in fact associated with the number of produced patents¹⁴, although this is not necessarily correlated to higher profitability¹⁵.

Furthermore, acquirer's HR policies and reward systems quality leads to lower hostility among target's employees¹⁶, which in turn might be related to better results, given the positive effects of employees' retention¹⁷.

Domestic and cross-border experience, acquirers' age and size are common controls in the vast majority of state-of-the-art studies¹⁸.

Target-firm specific factors. Subsidiary's capability of generating knowledge, sourcing it and integrating from multiple sources is positively linked to subsidiary's innovation¹⁹. In turn, multinationals performance is associated with subsidiaries knowledge outflows, driven by knowledge explicitness and frequency of communication with headquarters²⁰. Knowledge complementarity between the parties has a positive impact on learning within the merged entity²¹. Indeed, local complementary assets are essential in order to obtain sustained cross-

¹² (Denicolai et al. 2014)

¹³ (Higgins & Rodriguez 2006)

¹⁴ (Hussinger 2012)

¹⁵ (Mahlich 2010)

¹⁶ (Stahl et al. 2012)

¹⁷ (Ahammad et al. 2014)

¹⁸ (Ahammad & Glaister 2013; Ahammad et al. 2014)

¹⁹ (Michailova & Zhan 2014)

²⁰ "Codified knowledge transmittable in formal and systematic language" (Crespo et al. 2014)

²¹ (Zou, H., & Ghauri 2008)

border performance²². Deals return more to acquirer's shareholders when both parties own strategically valuable resources and capabilities²³.

Prior collaboration with acquirer fosters employees' trust within target firms²⁴, which suggests a smoother integration process. Also, targets located in developed countries experience higher CAR²⁵. Target size, relative profitability, relatedness, private versus public nature are common controls.

Deal-specific factors. Earn out agreements foster higher performance²⁶. Stock-financed deals are positively associated with CAR, although evidence might not hold with longer-term performance²⁷. Friendly takeovers and low removal of target autonomy have a positive impact on employees' trust, which in turn drives better M&A outcomes²⁸.

In high-technology firms, whether or not integrating the target is a strategic decision based on industry specifics and on cultural and institutional distance and impacts value creation.²⁹ Deal size, percentage of control sought, difference between initial and final stake are common controls³⁰.

Process-specific factors. Strategic and organizational fit³¹ are core determinants of performance³² and a thorough due diligence tackling employees and business capabilities is

²² (Denicolai et al. 2014)

²³ (Grill & Bresser 2013)

²⁴ (Stahl et al. 2012)

²⁵ (Nicholson & Salaber 2013; Francoeur 2007)

²⁶ (Barbopoulos & Sudarsanam 2012)

²⁷ (Dutta et al. 2013; Heron & Lie 2002)

²⁸ (Stahl et al. 2012)

²⁹ (Zhu et al. 2015)

³⁰ (Barbopoulos & Sudarsanam 2012; Dakessian & Feldmann 2013; Dikova & Rao Sahib 2013)

³¹ Strategic fit: the degree to which target firm augments or complements the parent's strategy thus contributing to parent's financial and non-financial goals; organizational fit: the way firms can be integrated with respect to day-to-day operations (administrative, cultural and personnel practices) once the acquisition has been made (Jemison et al., 1986)

associated with better outcomes, while investment, financing, tax, legal and IT issues examination are not significant³³. Knowledge transfer and employees retention have a positive impact on performance, yet mitigated by organizational cultural distance³⁴. Managerial support and communication with employees impacts resistance behaviors, which can undermine M&A success given the vital importance of involving key operating managers and staff in the process³⁵. Assimilation and internalization of tacit knowledge³⁶ positively impacts cross-border acquisition performance and allows application in future operations³⁷. A comprehensive list of process-related problems is provided in (Very & Schweiger 2001) and (Jemison & Sitkin 1986).

Environmental factors. Cultural and institutional distance do impact cross-border outcomes, but with little agreement on research findings³⁸. High-tech firms experience higher realized performance when their target is located in countries experiencing weak property rights protection³⁹. Industry-specific sales growth do affect M&A performance of horizontal deals, as well as industry sales concentration, which affects CAR negatively. Foreign competition within the industry, industry technological intensity and degree of deregulation affect M&A outcomes⁴⁰, together with real exchange rates levels, industry and country competition⁴¹.

³² (Jemison & Sitkin 1986)

³³ (Ahammad & Glaister 2013)

³⁴ (Ahammad et al. 2014) and (Zou, H., & Ghauri 2008)

³⁵ (Jemison & Sitkin 1986)

³⁶ Non codified Knowledge concerning local market, networking skills and specific R&D capabilities

³⁷ (Zou, H., & Ghauri 2008)

³⁸ (Crespo et al. 2014; Dakessian & Feldmann 2013; Nicholson & Salaber 2013), (Wang & Schaan 2008; Ahammad et al. 2014; Nicholson & Salaber 2013)

³⁹ (Zhu & Qian 2014)

⁴⁰ (Huyghebaert & Luypaert 2013)

⁴¹ (Dakessian & Feldmann 2013; Wang & Schaan 2008)

Conclusion. Provided the complex nature of the topic at hand, the extant literature is accordingly wide in scope. At target, acquirer and process level endogenous factors revolve around either knowledge management, HR aspects and/or access to strategic resources. Instead, environmental studies account for exogenous factors, while research on deal structures is rather related to management decision-making on payment methods, percentage sought and the like. In order to tackle the research question from a managerial perspective, this study focuses on deal-specific factors and particularly on those believed to directly affect long-term performance.

3. Theoretical framework

3.1. Dependent variable

State-of-the-art research provides a variety of performance definitions and metrics, whose choice depends on research aims and scope. In this research performance is defined as acquiring companies' long-term⁴² operating results measured as Gross profit percent change over the 3 years following deal completion. Data was sourced from acquirers' financial statements and then aggregated in order to obtain the metric below.

$$\% \Delta \text{Gross profit}_{3 \text{ years}} = \frac{\text{Gross profit level}_{t+3} - \text{Gross profit level}_t}{\text{Gross profit level}_t} \quad 43$$

Using this metric allows to consider both growth in sales revenues and costs rationalization, which provides a more thorough approach to acquirer's growth than considering sales growth alone. Cost of goods sold is actually one of the most relevant costs components within pharmaceutical companies, doubling R&D expenses and representing around 30%

⁴² Although it is actually hard to draw a clear boundary between short and long term, 3 to 5 years are generally considered a reasonable horizon by extant research.

⁴³ t = year of deal completion and $\text{Gross profit} = \text{Revenues from Sales} - \text{Cost of goods sold}$

of sales in brand name companies⁴⁴ and an even higher percentage in generics manufacturers. This suggests that controlling raw materials expenditures as well as inventory management is an essential determinant of competitiveness. Although assessing margins improvement is a reasonable approach to performance measurement, limitations of this metric are discussed in section 7.

3.2. Independent variables

Diversification. Acquiring companies can decide whether to expand into the same business through horizontal M&A or to diversify into new activities and create a conglomerate. In turn, diversification can either involve the same stage of the value chain or qualify as vertical integration⁴⁵. Horizontal M&A are generally associated with increased market share and economies of scale, while diversification can lead to more efficient access to input resources or distribution channels in case of vertical integration, or on stability of revenue streams contrasting industry maturity.

H₁ below is built on previous findings on the pharmaceutical industry and assuming that direct correlation exists between the number of innovations developed and sales growth, which is in accordance with extant research findings⁴⁶. Evidence supports that scale obtained through *horizontal M&A* and increased R&D spending in the same innovation domain are not necessary nor sufficient conditions for enhanced R&D productivity and that in fact many new compounds are rather developed by small firms⁴⁷. R&D development

⁴⁴ (AT Kearney 2009), (Basu et al. 2008)

⁴⁵ *Horizontal merger*: combination of two competing firms (Gaughan, 2007); *Conglomerate*: combination of companies that are not competitors nor have a buyer-seller relationship (Gaughan, 2007); *Vertical integration*: combination of companies having a buyer-seller relationship (Gaughan, 2007).

⁴⁶ (Hsu et al. 2013)

⁴⁷ (Danzon P.M., Epstein A. 2007; Achilladelis & Antonakis 2001)

performance⁴⁸ is instead reported to be related to economies of scope⁴⁹, being efficient and effective for a company to apply knowledge in one area to other domains. According to historical evidence, *diversification* especially in high growth sectors is crucial within the pharmaceutical industry in order to overcome periods of stalling revenues and sustain the existing volume of R&D expenses⁵⁰.

Vertical integration has a determinant role in creating an innovation base and contributing to build a sustained competitive advantage for firms. In fact, it leads to innovations having a disruptive potential and a wider breadth among different fields due to access to valuable and complementary knowledge sourced along the value chain⁵¹.

Drawing on arguments above on the beneficial outcomes of diversification and vertical integration, H₁ is formulated, according to which revenue stability, higher invention importance and wider invention domain would drive positive M&A outcomes.

H₁: Diversification has a positive impact on performance

Geographical proximity. Geographical distance is claimed not to be beneficial to M&A outcomes, since it generally entails information asymmetries hindering *ex-ante* valuation of business opportunities and *ex-post* monitoring of target activity⁵². Other issues include reduced knowledge of non-domestic markets⁵³, difficult technology transfer and internal resources deployment⁵⁴, *liability of foreignness*, *double-layered acculturation* and *winner's*

⁴⁸ Product successfully passing all phases of clinical tests

⁴⁹ (Cockburn & Henderson 2001)

⁵⁰ (Achilladelis & Antonakis 2001)

⁵¹ (Mishra & Slotegraaf 2013)

⁵² (Kang & Kim 2008; Uysal et al. 2008)

⁵³ (Hitt et al. 2006)

⁵⁴ (Dikova & Rao Sahib 2013; Kogut & Zander 1992)

*curse*⁵⁵. Instead, geographical proximity allows easier access to valuable information and is generally associated with value-enhancing governance activities at targets – e.g. poor management replacement and acquirer’s representation into the target’s board⁵⁶ leading to positive long-term operating performance⁵⁷. Furthermore, geographical proximity fosters operating and knowledge synergies⁵⁸. In formulating H₂ it is also assumed that Western European acquirers are more knowledgeable about Western European markets than they are about further areas of the world.

H₂: Geographical proximity has a positive impact on performance

Asset deals. Strategic resources can be acquired either purchasing equity or assets of the target firm. Asset purchases allow to select the purchased resources and leave behind items which are not value-adding – e.g., target’s liabilities. However, control might be an issue – e.g., as the asset is embedded in the target firm problems might arise due to target’s *de facto* control. Evidence supports that asset purchases are associated with greater acquirer’s gains compared to stock deals⁵⁹. Allowing direct IP transfer while avoiding the complex integration process, asset purchase is a mean for pharmaceutical and biotech firms to save costs and avoid risk related to testing and bringing to the market a brand new product over the long time-horizon which is typical within the industries at hand. This would provide revenues stability and shorter time-to-market.

⁵⁵ *Liability of foreignness*: costs of operating beyond national boundaries

Double-layered acculturation: the necessity for the company expanding its operations abroad to become acquainted with national environment of the host country as well as with the organization of the acquire company (Dikova et al, 2013)

Winner’s curse: in the context of a M&A auction foreign bidders incur information disadvantages compared to local players, thus overpaying in case of success (Uysal et al., 2006)

⁵⁶ (Kang & Kim 2008)

⁵⁷ (Uysal et al. 2008)

⁵⁸ (Uysal et al. 2008)

⁵⁹ (Ray & Warusawitharana 2009)

H₃: Asset purchase drives higher M&A performance

Method of payment. The currency used to settle the deal – i.e., whether to pay providing acquirer's stock or cash to target firm – is one of the most relevant aspects of M&A operations. Due to the considerable uncertainty surrounding cross-border deals than domestic investment, the importance of payment method gets even more compelling within the present framework. Whereas cash-financed M&A generally entail local management replacement, a first relevant advantage of stock payments consists in keeping core human resources within the target firm⁶⁰. This leads to a less disruptive integration process in which local expertise is retained. Indeed, long-term indirect effects arising from turnover might turn to be detrimental to acquirer's value and undermine M&A success in the worst case⁶¹. Employees and particularly senior management retention is actually a direct determinant of knowledge transfer⁶². Empirical evidence actually suggests that tacit knowledge⁶³ transfer is an essential determinant of cross-border deals' outcomes⁶⁴ and a source of competitive advantage due to difficult imitation⁶⁵.

H₄: Stock-financed deals positively impact performance

As already mentioned above, information asymmetries are generally a matter of distance.

⁶⁰ (Dutta et al. 2013)

⁶¹ (Chen & Hennart 2004)

⁶² (Ahammad et al. 2014)

⁶³ *Tacit knowledge*: knowledge embedded in people and not transferable in codified form. Here it is broadly defined and includes *products and service design, R&D, service/manufacturing operations, purchasing/supplier relations, distribution, HRM, marketing and Sales, strategic planning, Customer service, Investment appraisal and financial reporting* (Ahammad et al., 2014)

⁶⁴ (Ahammad et al. 2014; Zou, H., & Ghauri 2008)

⁶⁵ (Mishra & Slotegraaf 2013)

Through stock-financing target's shareholders share post-deal risks with the acquirer and a "lock-in" effect is created similar to that claimed within the *hostage theory*⁶⁶, which mitigates information asymmetries.

H₅: Stock-financed deals positively moderate the relation between geographic proximity and performance

3.3. Control variables

Acquirer and deal size. Acquirer and deal size are common controls in state-of-the-art research. Since they might have some unforeseen influence over M&A performance, they have been included in order to avoid biased conclusions.

Speed of completion. The time elapsed between deal announcement and completion is also being considered as control. Indeed, this variable might be considered a proxy of negotiation power and/or influence performance outcomes. Its inclusion is thus believed to add precision to the model⁶⁷.

4. Data and methodology

Sample. A list of cross-border M&A deals completed by Western European pharmaceutical and biotech⁶⁸ companies between 2000 and 2009 was collected on Bloomberg. Results were then filtered in order to obtain only completed deals made by public bidders seeking 50% or more of target firm. Considering only public bidders was aimed at avoiding disclosed data unavailability due to the private nature of companies. The ownership threshold was set assuming that higher ownership means higher impact on acquirer's performance due to

⁶⁶ Theory claiming that targets screening and monitoring is facilitated when target firms share risks with acquiring company (Chen & Hennart 2004)

⁶⁷ (Hunter & Jagtiani 2003), (Grinstein & Hribar 2004)

⁶⁸ The pharmaceutical industry considered in the current work includes: medical generic drugs manufacturing, drug delivery systems, medical wholesale drug distribution, pharmacy services, therapeutics, veterinary diagnostics and products, vitamins and nutrition products, wound/burn skincare products. Biotechnology industry includes medical-biomedical and gene manipulation activities.

stronger control. After filtering by these criteria and accounting for data unavailability, the initial sample decreased to 187 observations.

As showed in table 1, observations are considerably variable in acquirers' and deal size⁶⁹. Values range from 4M€ to 86B€⁷⁰ with only one fifth of sample being above average and from 200k€ to nearly 13B€ with 32 deals raising the average deal value respectively. The number of horizontal deals is approximately equal to that of diversification operations, with diversifying companies evenly broken into vertical integration and related or unrelated diversification. The vast majority of deals are cash-financed equity deals. Asset purchases mainly involve IP acquisition – i.e., manufacturing or marketing rights on products. Cross-border activity occurs within and outside Western Europe almost evenly. Acquirers' long-term performance⁷¹ is positive on average, with one in five companies performing above average.

Methodology. In this cross-sectional correlational study data on the independent variables were sourced from Bloomberg, while the dependent variable was built from data gathered from acquirers' financial statements. An overview of variables with definition, measurement, labels and source is reported in table 2. In order to test the hypotheses above and answer the research question data were collected for each deal, aggregated into a dataset and then analyzed within a multiple linear regression model.

⁶⁹ The wide variability of these values is accounted for in the regression model controlling for heteroskedasticity.

⁷⁰ Total asset is used as a proxy of company size

⁷¹ See section 3.1. for definition

A baseline model, referred to as Model I, accounts for the direct effect of independent variables on the dependent⁷². In order to test HP₅ the interaction effect of payment method on geographical distance is further introduced thus obtaining Model II. Regressions were run on STATA. Heteroskedasticity was tested and accounted for in order to obtain robust results. Below are the analytical expression of Model I and II. Testing our hypotheses entails estimating magnitude and sign of the β coefficients associated with each independent variable as well as their statistical significance. Results are reported in the next section.

$$\Delta\% \text{ Performance}_{3\text{years}} = \beta_0 + \beta_1 \text{Payment} + \beta_2 \text{Type} + \beta_3 \text{Geo} + \beta_4 \text{Diversification} + \beta_5 \text{Speed} + \beta_6 \text{Size} + \beta_7 \text{Asset} + \nu^{73}$$

Equation 1. Model I: variation in Performance explained by direct effect of independent variables

$$\Delta\% \text{ Performance}_{3\text{years}} = \beta_0 + \beta_1 \text{Payment} + \beta_2 \text{Type} + \beta_3 \text{Geo} + \beta_4 \text{Diversification} + \beta_5 \text{Speed} + \beta_6 \text{Size} + \beta_7 \text{Asset} + \beta_8 \text{Geo} * \text{Payment} + \nu$$

Equation 2. Model II: variation in Performance explained by direct effect of independent variables and by interaction effect of payment method on geographical distance

Collinearity Test. The model respects the OLS assumption of no perfect collinearity. Indeed, the Correlation matrix in Table 3 shows that there is no perfect correlation among independent variables since the bivariate correlation coefficients are low.

Homoskedasticity test⁷⁴. Since data were found to be heteroskedastic after the Breusch-Pagan test (see Appendix A, Table 4), the robust test was implemented in order to make up for heteroskedasticity and provide reliable results.

⁷² I.e., to test HP 1, 2, 3, 4

⁷³ β_0 is the intercept; β_i ($i=1,2,...6$) measure the change in Performance with respect to each independent variable, holding other factors fixed; ν is the error term measuring unobserved factors determining the level of Performance.

⁷⁴ Homoskedasticity is one of the assumptions of the OLS model. Namely, the variance of unobserved factors conditional on independent variables has to be constant. Heteroskedasticity test is used in STATA to check whether the assumption holds and to correct for it, if necessary, when implementing the model.

5. Results

Regression results for Model I and II are reported in Table 5 and 6. A summary of results is provided in Table 7.

R^2 ⁷⁵. The selected independent variables all together explain 8% of the variation in Performance and 10% when accounting for interaction. The low values suggests that the selected independent variables provide low predictability of individual behavior.

Hypothesis 1: Diversification. β_4 is positive and statistically significant at 0.05 level in both models. Hypothesis 1, supporting that diversification is associated with positive performance, cannot thus be rejected.

Hypothesis 2: Geographical proximity. Against expectations, β_3 is negative in both models, suggesting that expansion outside Western Europe is positively correlated with performance. However, since results are not significant hypothesis 2 has to be rejected.

Hypothesis 3: Deal type. β_2 is positive and significant at the 0.10 level, which makes it reasonable to accept Hypothesis 3. Results hold for both models.

Hypothesis 4: Method of payment. In both Model I and Model II β_1 is positive and significant at the 0.05 confidence level, which sustains Hypothesis 4: stock or mixed deals are associated with higher performance.

Hypothesis 5: Interaction effect. β_8 is significant at the 0.05 confidence level, empirically sustaining the existence of a moderating effect of payment method on the relation between geographical proximity and performance. However, being β_8 negative Hypothesis 5 has to be rejected: differently than expected, stock-financing has a negative impact on the relation

⁷⁵ R^2 indicates the proportion of the sample variation in the dependent variable which is explained by the OLS regression line and is thus regarded as a metric for goodness-of-fit.

between geographical proximity and performance. For further insights about the interaction term see Table 1 in Appendix B.

Acquirer size. Both models return a negative β_7 significant at the 0.01 level, suggesting that the smaller the acquirers are the higher their performance is.

Deal size. β_6 is found to be negative and not significant in both models, reporting positive performance associated with smaller deals.

Speed of completion. Both models return negative β_5 , suggesting that the shorter the time elapsed between deal announcement and completion the better the performance is. Model II reports 0.1 significance level.

6. Discussion and conclusion

The original purpose of this research was to find out the deal-specific factors impacting long-term M&A performance in cross-border deals and the nature of such relations in the context of pharmaceutical and biotech companies.

Empirical evidence sustains that diversification drives better performance, which is in accordance with previous findings supporting economies of scope against economies of scale in expanding products pipeline. This might be further motivated by wider invention importance and domain as well as raw materials costs cutting and stronger distribution in case of vertical integration.

Asset purchase has been found to be more effective than stock deals, which might be explained by the advantage of acquiring IP and widening the pipeline while avoiding long and expensive testing of new products as well as the hurdles of integration.

Stock deals are beneficial to performance, which might be motivated by the alignment of interest and prevention of misbehaviors created by tying targets to acquirers' performance.

Furthermore, payment method has also a strong and significant moderating effect on geographical distance. Specifically, stock financing negatively moderates the relation between geographical proximity and performance, supporting a branch of literature claiming that stock-deals are more suitable when targets are located close to acquirers⁷⁶.

Acquirers' size is negatively correlated with performance, which supports previous statements about economies of scale. Moreover, the longer the time elapsed between announcement and completion, the worse the deal outcome, which makes room for hypotheses on target resistance behaviors and their negative effects over the long-term.

Although not supported by significance, data suggest that expansion outside Western Europe is associated with positive outcomes. This might support that the possibilities opened up by entering new markets outweigh potential costs stemming from cultural distance and information asymmetries.

Results lead to conclude that it would be reasonable for pharmaceutical and biotech companies to leverage their knowledge through diversification and engage in IP acquisitions instead of controlling targets through stock purchase. Expansion in far markets shall be recognized as a chance to grow revenues in new markets, with method of payment outweighing geographical distance.

However, research limitations call for caution and make room for further investigation.

⁷⁶ (Kang & Kim 2008)

7. Limitations and further research

Sample. The sample includes only public companies headquartered in Western Europe, which limits the generality of results. Indeed, including private companies as well as international acquirers would add to the reliability of research.

Fix effects. M&A outcomes are not necessarily the direct result of a single deal, since especially in the long term other corporate events might have impacted on acquirer's performance. Accounting for fix effect would thus add to reliability.

Dependent variable. Using Gross profit restricts the effects of independent variables to revenues and COGS. However, these are not the only metrics affected by M&A activity. Indeed, synergies arising from layoffs of redundant employees as well as effects on taxes and/or other costs components could be studied using other dependent variables, such as Net Income, EBIT and the like.

Independent variables. Including other factors than those related to the deal domain would add predictive power to the model – e.g., including price dynamics following market concentration, would provide further insights.

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9. Appendix A

	Mean	Std. Dev.	Min	Max	Number	Percentage
Speed of completion (days)	46.95	61.69	0	320		
Below average					115	61.497%
Above average					72	38.503%
Method of payment:						
Stock or mixed					30	16.043%
Cash					157	83.957%
Deal type:						
Asset purchase					66	35.294%
Equity purchase					121	64.706%
Asset purchase - item purchased:						
Property rights purchase					44	66.667%
Business unit					22	33.333%
Deal size (M US\$)	399.34	1369.7	0.2	14667.6		
Below average					155	82.888%
Above average					32	17.112%
Geographical proximity:						
Outside western Europe					86	45.989%
Inside Western Europe					101	54.011%
Target business:						
Horizontal expansion					103	55.080%
Diversification					84	44.920%
Diversification:						
Vertical integration					40	47.619%
Other (related or unrelated diversification)					44	52.381%
Acquirer total asset (M Euro)	11128.54	19330.35	4.37	86658		
Below average					142	75.936%
Above average					45	24.064%
Δ Gross Profit 3 years after merger completion (%)	0.84	2.44	-2.36	17.52		
Below average					152	81.283%
Above average					35	18.717%

Table 1. Sample description

	Definition	Measurement	Source	Label
Independent variables				
Payment method	Currency used to purchase stake in the target firm, either cash, stock or mixed payment.	Dummy: 1 if paid in Stock or mixed payment, 0 if paid in Cash	Bloomberg	Payment
Deal type	Dummy distinguishing asset purchases from equity deal	Dummy: 1 if Asset purchase, 0 if Equity deal	Bloomberg	Type
Geographical proximity	Dummy accounting for whether the cross-border deal is undertaken within or outside Western Europe	Dummy: 1 if inside Wester Europe, 0 if Outside western Europe	Bloomberg	Geo
Diversification	Dummy accounting for whether the deal qualifies as diversification or horizontal expansion	Dummy: 1 if Diversification, 0 Horizontal expansion	Bloomberg	Diversification
Control variables				
Speed of completion	Number of days elapsed between announcement date and completion	Days between deal announcement and completion as reported in source	Bloomberg	Speed
Deal size	Amount paid to target firm		Bloomberg	Size
Acquirer size	Size of firm measured as total assets	Total asset reported one year before deal completion	Financial Statements	Asset
Dependent variable				
Three years Gross Profit growth rate after deal completion		Difference between level of GP 3 years after and 1 year before deal completion, scaled by GP 1 year before deal completion	Financial Statements	Performance

Table 2. Description of variables used: definition, measurement, labels and source

	Speed	Payment	Type	Size	Geo	Diversification	Asset	Performance
Speed	1							
Payment	0.0006	1						
Type	-0.0841	-0.2619	1					
Size	0.2586	-0.0156	-0.1563	1				
Geo	-0.095	0.1229	-0.0528	-0.0755	1			
Diversification	0.0132	-0.1032	-0.0754	0.0561	-0.008	1		
Asset	0.3091	-0.202	0.0553	0.1906	-0.1747	-0.0644	1	
Performance	-0.1178	0.1176	0.1085	-0.0688	0.0252	0.1214	-0.168	1

Table 3. Correlation matrix for Collinearity test

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of Performance

chi2(1) = 130.18

Prob > chi2 = 0.0000

Table 4. Heteroskedasticity test

Number of obs = 187
F(8. 178) = 2.42
Prob > F = 0.0216
R-squared = 0.0802
Root MSE = 23.884

Performance	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Speed	-.0027379	.001756	-1.56	0.121	-.006203	.0007272
1.Payment	1.005	.5264208	1.91	0.058	-.0329972	2.044581
1.Type	.8015896	.4429716	1.81	0.072	-.0725288	1.675708
Size	-.0000194	.0000268	-0.73	0.469	-.0000723	.0000334
1.Geo	-.0561078	.3415394	-0.16	0.870	-.7300694	.6178537
1.Diversification	.69989	.3442517	2.03	0.044	.0205764	1.379204
Asset	-.0000146	5.45e-06	-2.68	0.008	-.0000253	-3.84e-06
_cons	.3327772	.2192344	1.52	0.131	-.0998392	.7653936

Table 5. Regression results for Model I

Number of obs = 187
F(8. 178) = 2.14
Prob > F = 0.0345
R-squared = 0.1036
Root MSE = 23.645

Performance	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
Speed	-.0028915	.0017307	-1.67	0.097	-.0063068	.0005238
1.Payment	1.769	.7822117	2.26	0.025	.2261855	3.313389
1.Type	.8398872	.4434543	1.89	0.060	-.0352171	1.714992
Size	-.0000166	.0000324	-0.51	0.609	-.0000805	.0000473
1.Geo	-.3593426	.3711896	-0.97	0.334	-1.091841	.3731559
1.Diversification	.7312238	.3425329	2.13	0.034	.0552759	1.407172
Asset	-.0000151	5.47e-06	-2.77	0.006	-.0000259	-4.35e-06
1.Interaction01	-1.947	.8170814	-2.38	0.018	-3.559699	-.3348735
_cons	.4560504	.2312526	1.97	0.050	-.000299	.9123998

Table 6. Regression results for Model II

	Model I	Model II
Independent variables		
Payment method	1.005 *	1.769 *
Deal type	.8015896 ***	.8398872 ***
Geographical proximity	-.0561078	-.3593426
Diversification	.69989 *	.7312238 *
Control variables		
Speed of completion	-.0027379	-.0028915 ***
Deal size	-.0000194	-.0000166
Acquirer size	-.0000146 **	-.0000151 **
Interaction term		
Interaction 01		-1.947 *
R ²	0.0802	0.1036

Notes:

*p<0.05 **p<0.01 ***p<0.001

Table 7. Summary of results

10. Appendix B

While all information relevant for a thorough comprehension of this research is included in Appendix A, this appendix provides additional insights on empirical findings.

H₅: Stock-financed deals positively moderate the relation between geographic proximity and performance

			Coef.	Std. Err.	t	P> t	[95% Conf.
Marginal effect of geographical							
Interaction 0 1	Geographic proximity =0 (outside WE) Payment method=1 (stock)	proximity on performance when deal is stock-financed and target is outside Western Europe	-1.947	.8170814	2.38	0.018	-.3559 - .3348735
Marginal effect of geographical							
Interaction 1 1	Geographic proximity =1 (within WE) Payment method=1 (stock)	proximity on performance when deal is stock-financed and target is within Western Europe	2.089	.9516029	2.20	0.029	.2114628 3.967
Marginal effect of geographical							
Interaction 1 0	Geographic proximity =1 (within WE) Payment method=0 (cash)	proximity on performance when deal is cash-financed and target is within Western Europe	-1.754678	.8773415	-2.00	0.047	3.486 -.0233485
Marginal effect of geographical							
Interaction 0 0	Geographic proximity =0 (outside WE) Payment method=0 (cash)	proximity on performance when deal is cash-financed and target is outside Western Europe	2.073	.9520902	2.18	0.031	.1946147 3.952

Notes: Stock-financed deals moderate positively the relation between geographical proximity and performance when target are located within Western Europe. When targets are located outside Western Europe, the relation between geographical proximity and performance is positively moderated by cash-financing. Thus, findings support that stock financing is suitable when targets are closer to acquirers, while cash financing is beneficial to performance when targets are geographically distant.

Table 1. Summary of findings on interaction term